

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A rotating electrical machine for a vehicle, comprising:
a stator including a multi-phase armature winding wound around an armature core;
a rotor including a pair of field cores which are disposed at an inner diameter side of the armature core through a gap and rotate together with a rotating shaft; and
a field winding for magnetizing the pair of field cores,
wherein the pair of field cores respectively includes a plurality of magnetic poles extending in an axial direction of the rotating shaft and being arranged to alternately engage with each other through a predetermined clearance Dc,
each of the plurality of magnetic poles having a width in a ~~rotation~~rotational direction thereof which is formed in a stair shape ~~to be and~~ smaller toward a tip ~~of width thereof~~, and
the clearance Dc between adjacent ~~the plurality of~~ magnetic poles is set within a range from 50° to 70° in electrical angle.

2. (currently amended): A rotating electrical machine for a vehicle according to claim 1, wherein the width of each of the stair-shaped magnetic poles in the ~~rotation~~rotational direction has a two-step structure in which the width at the tip is narrow, and when the magnetic pole width at a wide ~~side portion~~ is ~~made~~ Da in electrical angle and the magnetic pole width at ~~a the~~ narrow ~~side tip~~ is ~~made~~ Db in electrical angle, the magnetic pole width Da and the magnetic pole width Db are set within ranges of

$$(206 - Dc)^{\circ} \leq Da \leq (226 - Dc)^{\circ} \text{ and}$$

$$(134 - Dc)^{\circ} \leq Db \leq (154 - Dc)^{\circ}.$$

3. (currently amended): A rotating electrical machine for a vehicle according to claim 1, wherein the width of each of the stair-shaped magnetic poles in the ~~rotation~~rotational direction has a multi-step structure in which the width at the tip is narrow, and when respective widths of the magnetic pole are divided into a wide Da group and a narrow Db group in electrical angle, the Da group and the Db group of the respective magnetic pole widths are set within ranges of

$$(206 - Dc)^{\circ} \leq Da \leq (226 - Dc)^{\circ} \text{ and}$$

$$(134 - Dc)^{\circ} \leq Db \leq (154 - Dc)^{\circ}.$$

4. (currently amended): A rotating electrical machine for a vehicle according to claim 1, wherein at least one of (1) corners of step parts and (2) corners of tip parts of the stair-shaped magnetic poles are cut off to form chamfer shapes.

5. (original): A rotating electrical machine for a vehicle according to claim 1, further comprising inclined parts, whose magnetic pole widths are changed in the axial direction of the rotating shaft, between respective parts of the stair-shaped magnetic poles where the magnetic pole widths are different from each other.

6. (currently amended): A rotating electrical machine for a vehicle according to claim 1, wherein a magnetized permanent magnet is interposed between adjacent magnetic poles, and ring-shaped coupling members are fitted to at least tip part outer peripheries of the magnetic poles.

7. (currently amended): A rotating electrical machine for a vehicle according to claim 6, wherein ~~a magnetized permanent magnet intervenes between adjacent magnetic poles, and the~~ coupling members are saturated by a magnetic flux of the permanent magnet.

8. (original): A rotating electrical machine for a vehicle according to claim 1, wherein the armature core includes slots around which the armature winding is wound, the number of slots is two for each polarity and each phase, and open pitches between the respective slots are uneven pitches.

9. (original): A rotating electrical machine for a vehicle according to claim 8, wherein the open pitch between the slots in which adjacent windings having a same phase are inserted is 32.5° in electrical angle, and the open pitch between the slots in which adjacent windings having different phases are inserted is 27.5° in electrical angle.

10. (currently amended): A rotating electrical machine for a vehicle according to claim 8, wherein the width of each of the stair-shaped magnetic poles in the ~~rotation~~rotational direction has a two-step structure in which the width at the tip is narrow, and when the magnetic pole width at a wide ~~side~~portion is ~~made~~Da in electrical angle and the magnetic pole width at ~~a~~the narrow ~~side~~tip is ~~made~~Db in electrical angle, the magnetic pole width Da and the magnetic pole width Db are set within ranges of

$$(195.7 - Dc)^{\circ} \leq Da \leq (215.7 - Dc)^{\circ} \text{ and}$$

$$(144.3 - Dc)^{\circ} \leq Db \leq (164.3 - Dc)^{\circ}.$$

11. (currently amended): A rotating electrical machine for a vehicle according to claim 8, wherein the width of each of the stair-shaped magnetic poles in the ~~rotation~~rotational direction has a multi-step structure in which the width at the tip is narrow, and when respective widths of the magnetic pole are divided into a wide Da group and a narrow Db group in electrical angle, the Da group and the Db group of the respective magnetic pole widths are set within ranges of

$$(195.7 - Dc)^{\circ} \leq Da \leq (215.7 - Dc)^{\circ} \text{ and}$$

$$(144.3 - Dc)^{\circ} \leq Db \leq (164.3 - Dc)^{\circ}.$$

12. (currently amended): A rotating electrical machine for a vehicle according to claim 1, wherein a step part is formed~~whose tip side is expanded is provided~~ at an inner diameter side portion of the stair-shaped magnetic pole and at an almost identical position to a step part of the stair shape, and a rectangularly shaped permanent magnet is provided on a side surface of the inner diameter portion step part.

13. (currently amended): A rotating electrical machine for a vehicle according to claim 12, wherein corner parts of the magnetic poles at the tip part inner diameter ~~side~~ portion are cut out to form chamfer shapes.

14. (original): A rotating electrical machine for a vehicle according to claim ~~12~~ 1, wherein a step part is formed on an inner-diameter portion of the stair-shaped magnetic pole and at an almost identical position to a step part of the stair shape, and a permanent magnet is fitted to the extreme tip side inner surface of the step part ~~provided at~~ formed on the inner diameter portion of the magnetic pole.